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GRADUATE COLLEGE

A COMPARATIVE STUDY OF THE READABILITY
OF SELECTED ACCOUNTING TEXTBOOKS

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

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degree of

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BY

CLAIRE LINDSAY GARNIER SMITH

Norman, Oklahoma

1975

A COMPARATIVE STUDY OF THE READABILITY
OF SELECTED ACCOUNTING TEXTBOOKS

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DISSERTATION COMMITTEE

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A COMPARATIVE STUDY OF THE READABILITY
OF SELECTED ACCOUNTING TEXTBOOKS

CHAPTER I

THE PROBLEM

Introduction

Society has been concerned with readability for hundreds of years. Religious leaders made the first recorded attempt to study readability in 900 A.D.,¹ and educators considered the readability of children's books as early as 1840.²

E. L. Thorndike provided the impetus for the development of the first readability formula with the publication of The Teacher's Word Book in 1921. As a result of the publication, Lively and Pressey constructed a formula to ascertain readability in 1923. W. A. McCall and Lelah Mae Crabbs provided momentum for the continued development of readability formulas

¹Irving Lorge, "Word Lists as Background for Communication," Teachers College Record, XLV (May, 1944), 544.

²George R. Klare, The Measurement of Readability (Ames, Iowa: Iowa State University Press, 1963), p. 30.

via the publication of Standard Test Lessons in Reading in 1925. These graded passages ultimately became the most popular and acceptable criterion upon which to construct readability formulas.¹ Librarians also contributed to the development of readability formulas. A sub-committee of the Commission on the Library and Adult Education, the Sub-Committee on Readable Books, was established in 1925 in order to identify readable books for adults.²

Readability is used today:

1. To indicate legibility of either handwriting or typography.
2. To indicate ease of reading due to either the interest-value or the pleasantness of writing.
3. To indicate ease of understanding or comprehension due to the style of writing.³

The study focuses on the last facet of readability.

Teachers have readily accepted the teaching responsibility of transmitting subject content to students. Teachers have not readily accepted the teaching responsibility of improving the reading ability of students. In order to

¹Ibid., pp. 30-32.

²William S. Gray, "Progress in the Study of Readability," in Library Trends, ed. by Louis R. Wilson (Chicago: The University of Chicago Press, 1937), p. 238.

³Klare, The Measurement of Readability, p. 1.

fulfill the second teaching responsibility, teachers must determine the reading demands of particular subject areas and assist students in acquiring the reading skills necessary to meet these demands.¹

Content area textbooks generally enjoy a dominant role in American education because of the convenience textbooks offer both teachers and students. Textbooks are assumed to provide scholarly, encyclopedic, and concentrated information concerning a given content area and a source and method of learning for most students. The length, density of concepts, difficult vocabulary, and impersonal manner of textbooks frequently make reading a formidable task even for good students.²

Accounting textbooks have an especially great influence in the classroom. The readability of these textbooks is vitally important because 86 percent of accounting lectures follow the textbook closely, while only 52 percent of lectures in other courses follow the textbook closely.³ The purpose of

¹Melvin L. Michaels, "Subject Reading Improvement: A Neglected Teaching Responsibility," Journal of Reading, IX (October, 1965), 16.

²Walter Hill, "Content Textbook: Help or Hindrance?" Journal of Reading, X (March, 1967), 408-410.

³Alexander W. Astin, "Classroom Environment in Different Fields of Study," Journal of Educational Psychology, LVI (October, 1965), 278.

these textbooks--to communicate accounting principles and procedures--should not be stymied by reading levels which are inappropriate for students.

Statement of Problem

Teachers must consider the organization and presentation of content, usability by students, readability, aids to learning, authorship, and physical features¹ of accounting textbooks prior to selecting a textbook. Teachers must rely on experience to make judgments about most of these criteria; only readability lends itself to objective measurement. The general problem of the study is to provide teachers with information about readability which is applicable to the selection of accounting textbooks. Then teachers, when trying to match difficulty level of accounting textbooks and reading ability of students, will have more than judgment on which to rely.

The specific problems of the study are:

1. Do textbooks designed for high school accounting students have lower reading levels than those designed for more advanced students?
2. Do accounting textbooks published by different publishers have different reading levels?

¹Vernon A. Musselman and J. Marshall Hanna, Teaching Bookkeeping and Accounting (New York: Gregg Publishing Division, McGraw-Hill Book Company, 1960), pp. 333-334.

3. Is there a relationship between the reading difficulties of high school, vocational, and college accounting textbooks and the publishers of the textbooks?
4. Are high school accounting textbooks easier to read than vocational accounting textbooks?
5. Are vocational accounting textbooks easier to read than college accounting textbooks?
6. Are high school accounting textbooks easier to read than college accounting textbooks?
7. Are reading levels consistent throughout certain accounting textbooks but inconsistent throughout other accounting textbooks?

Statement of Purpose

The purpose of the study is to explore the readability of selected accounting textbooks. The exploration provides teachers with a comparison of the reading levels of selected high school, vocational, and college accounting textbooks. The exploration also provides teachers with a summary of certain characteristics of readability formulas, including the practical aspects of applying a selected readability formula to accounting textbooks. With such information readily available, teachers are in a better position to match the difficulty level of accounting textbooks and the reading ability of students. The matching process is an important teaching responsibility since reading is considered a prerequisite of success in accounting.

Theoretical Framework

Because students who comprehend reading material have less difficulty with accounting than those who do not comprehend reading material,¹ readable accounting textbooks are a prerequisite of student achievement. Since "success reinforces performance, releases further energy, and engenders favorable attitudes toward learning,"² students must have textbooks which are readable. Otherwise, students may become frustrated, which "discourages effort, gnaws viciously at interest, and begets indifference, resistance, or even severe inferiority."³

The reading problem in accounting is produced by the technical nature of the vocabulary, the reading level of instructional materials, and the relatively low reading level of students.⁴ Such technical reading is difficult for students because of the heavy load of facts and concepts, format variations which may lead to confusion, materials which may be uninteresting, unnecessarily high readability levels, and

¹Ibid., p. 21.

²Arthur I. Gates, et al., Educational Psychology (3rd ed.; New York: The Macmillan Company, 1950), p. 381.

³Ibid.

⁴Musselman and Hanna, Teaching Bookkeeping and Accounting, p. 23.

the assumption by writers of greater background than readers possess.¹ Little can be done about such things as the concept load or the interest level of accounting textbooks, but readability can be measured in an effort to match the difficulty level of accounting textbooks and the reading ability of students.²

Operational Definitions

In order to standardize terminology, each of the following terms has a specific meaning in the study:

High School Accounting Textbooks.--Textbooks designed to be used for one year, primarily by high school juniors and seniors.

Vocational Accounting Textbooks.--Textbooks designed to be used for one or two semesters, primarily by adults seeking post-secondary training.

College Accounting Textbooks.--Textbooks designed to be used for two semesters, primarily by college sophomores.

Reading Level (Dependent Variable).--Accounting textbooks appropriate for average students in a certain grade.³

¹Leo C. Fay, "What Research Has to Say about Reading in the Content Areas," The Reading Teacher, VIII (December, 1954), 69-70.

²Ibid., 70.

³Klare, The Measurement of Readability, p. 175.

Levels (Independent Variable).--Accounting textbooks at the high school, vocational, and college levels.

Publishers (Independent Variable).--Publisher 1 and Publisher 2 represent two publishers which have an accounting textbook represented at each level. Publisher 3 represents a miscellaneous group of publishers which did not have an accounting textbook represented at each level.

Readability.--The ease with which students understand and comprehend accounting textbooks because of the style of writing which is utilized.¹

Readability Formula.--A measuring procedure intended to predict the readability of accounting textbooks via quantitative, objective estimates of the difficulty of the style of writing.²

Publisher's Suggested Reading Level.--A method of assigning reading level to accounting textbooks which is as accurate as trained opinion permits.³

Teacher's Judgment.--A method of assigning reading

¹Ibid., p. 1.

²Ibid., p. 3.

³George D. Spache, Good Reading for Poor Readers (7th ed.; Champaign, Illinois: Garrard Publishing Company, 1970), p. 31.

difficulty to accounting textbooks which is based on previous experience and subjective knowledge.¹

Hypotheses To Be Tested

Several hypotheses are made about the readability of accounting textbooks. Stated formally, the hypotheses of the study are:

- H₁: There is a significant difference among the reading levels of textbooks designed for high school, vocational, and college accounting students.
- H₂: There is a significant difference among the reading levels of accounting textbooks published by different publishers.
- H₃: There is a significant relationship between the reading difficulties of accounting textbooks at the three levels and the publishers of the textbooks.
- H₄: There is a significant difference between selected high school and vocational accounting textbooks.
- H₅: There is a significant difference between selected vocational and college accounting textbooks.
- H₆: There is a significant difference between selected college and high school accounting textbooks.
- H₇: There is a significant difference among the variabilities of the reading levels of accounting textbooks.

¹Ibid., p. 30.

These hypotheses must be tested statistically in order to determine the degree of confidence to place in the hypotheses. Statistical testing dictates that the hypotheses be stated in the null:

- Ho₁: There is no significant difference among the reading levels of textbooks designed for high school, vocational, and college accounting students.
- Ho₂: There is no significant difference among the reading levels of accounting textbooks published by different publishers.
- Ho₃: There is no significant relationship between the reading difficulties of accounting textbooks at the three levels and the publishers of the textbooks.
- Ho₄: There is no significant difference between selected high school and vocational accounting textbooks.
- Ho₅: There is no significant difference between selected vocational and college accounting textbooks.
- Ho₆: There is no significant difference between selected college and high school accounting textbooks.
- Ho₇: There is no significant difference among the variabilities of the reading levels of accounting textbooks.

Assumptions

The study is based on several assumptions. The first assumption is that a readability formula provides a useful approximation of the reading level of accounting textbooks.

The second assumption is that students in accounting courses have reading abilities nearly commensurate with grade levels (i.e., eleventh grade students are assumed to be reading, on the average, at the eleventh grade level). The third assumption is that the most frequently used accounting textbooks provide a suitable basis for the selection of textbooks and that random samples from selected textbooks are representative of those textbooks.

Limitations

The study is limited to selected accounting textbooks. The results of the study should not be generalized to other textbooks or materials used in accounting nor to textbooks or materials used in other business courses. Additional limitations (those associated with readability formulas) are discussed in Chapter II.

Organization of the Study

Chapter I identifies the research problem and establishes the parameters of the study. Chapter II reviews literature concerning readability studies which have been conducted in various areas of business and literature concerning certain characteristics of readability formulas. Chapter III reports the methodology involved in exploring the readability of

selected high school, vocational, and college accounting textbooks. Chapter IV presents the results of the statistical tests which were used to analyze the data. Chapter V consists of the summary, conclusions, and recommendations.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

There are two primary reasons for a review of related literature. The first reason is to identify what research has and has not been conducted on a problem and the second reason is to explain the theoretical base of a problem.¹

An extensive review of literature failed to reveal a study concerning the readability of high school, vocational, and college accounting textbooks. Several related studies (i.e., business studies) do merit attention and are reviewed.

Since readable textbooks are a prerequisite of student achievement in accounting, awareness of certain characteristics of readability formulas should assist teachers who want to match the difficulty level of accounting textbooks and the reading ability of students. Selected characteristics of

¹Fred N. Kerlinger, Foundations of Behavioral Research (2nd ed.; New York: Holt, Rinehart and Winston, Inc., 1973), p. 696.

readability formulas are reviewed in order to assist teachers in selecting accounting textbooks which encourage student success.

Business Studies

Several studies have been completed which involve the readability of accounting textbooks. House¹ studied the effects of intelligence, proficiency in reading comprehension, proficiency in arithmetical relationships and computations, time required for satisfactory completion of assignments, rate of presentation of subject matter, business experience of the student, skill in handwriting, and clearness or vagueness of personal interests, goals, and objectives in order to determine the relationship of these areas to success in beginning bookkeeping. There were 357 student participants in the study.

Proficiency in reading comprehension was operationally defined to encompass both the textbook and the student. Textbook proficiency in reading comprehension included technical vocabulary load and readability of a high school bookkeeping textbook. House found 266 different, technical

¹Forest Wayne House, Factors Affecting Student Achievement in Beginning Bookkeeping in the High School, Delta Pi Epsilon Research Award Series (Stillwater, Oklahoma: Oklahoma Agricultural and Mechanical College, 1953), pp. 3-92.

bookkeeping terms in the first fifteen chapters, of which 45.5 percent were introduced in the first five chapters. By using the Flesch Reading Ease formula on 30 sample passages from a high school bookkeeping textbook, House found that the mean of the average sentence length in words was 20.9, the mean of the average number of syllables per 100 words was 153.9, and the mean readability score was 55.4 (tenth to twelfth grade level). The style of the samples from the bookkeeping textbook was determined to be "fairly difficult" and "dull." Student proficiency in reading comprehension included vocabulary proficiency, reading speed, and reading comprehension. House found that 62 percent of the participants were below the average tenth grade student in vocabulary proficiency, 59 percent of the participants were below the average tenth grade student in reading speed, and 60 percent of the participants were below the average tenth grade student in reading comprehension.

When questioned via questionnaires, students' responses resulted in some inconsistencies. That is, 63 percent reported the textbook and 73 percent reported the problem material easy to read and understand, while 83 percent reported rereading the material in order to understand it better, 39 percent reported many sentences which were too long and complicated

to read easily, and 44 percent reported failing to complete assignments because of an inability to understand the reading material.

House identified four characteristics of beginning bookkeeping which influenced proficiency in reading comprehension and affected student achievement: the heavy technical vocabulary load, the reading difficulty of the material, the wide range of reading levels among students, and the lack of student awareness of reading ability deficiencies. House concluded that a large majority of students did not have enough reading ability to read and comprehend the bookkeeping textbook. These students ranked below the average tenth grade student in reading ability, but needed to be reading at the tenth to twelfth grade level in order to read and understand the bookkeeping textbook.

Rhodes and Calhoun¹ sought to determine skills prerequisite to the successful study of bookkeeping. After identifying reading and arithmetic as the fundamental prerequisite skills, Rhodes and Calhoun decided that reading skills were more important than arithmetic skills in the successful study

¹George S. Rhodes and Calfrey C. Calhoun, "An Investigation of Reading Ability as Related to Successful Study of Beginning Bookkeeping," National Business Education Quarterly, XXXV (March, 1967), 22-30.

of bookkeeping. One hundred sixty-two students in five heterogeneous high schools were included in the study in order to determine the existence of a relationship between reading ability and bookkeeping achievement.

The findings of the study indicated that there were substantial relationships between bookkeeping scores and reading comprehension and between bookkeeping scores and reading vocabulary, but that there was only a negligible relationship between reading rate and bookkeeping success. Reading comprehension, reading vocabulary, and reading rate scores did predict success in bookkeeping, but such information was more useful to teachers for diagnostic purposes.

While other variables such as motivation, adequacy of counseling programs, arithmetic aptitude, and vocational aims of students also accounted for a portion of students' success in bookkeeping, adequate reading skills were necessary in order to insure a high likelihood of success in bookkeeping. Rhodes and Calhoun recommended that bookkeeping teachers build upon the reading skills of students by helping with the technical, abstract bookkeeping content. The researchers recommended that teachers concentrate on reading comprehension (which is both explanatory, narrative type material and analytical, problem type material), reading

vocabulary (which is specialized, exact, extensive, and contains many words with different and exact meanings in bookkeeping), and reading rate (which is best accomplished via improvements in reading comprehension and reading vocabulary). Student improvements in these three reading skills resulted when teachers: (1) determined the reading ability of each bookkeeping student, (2) determined the readability of bookkeeping instructional materials, and (3) provided each bookkeeping student with instructional materials which coincided with the student's reading level.

Calhoun and Calhoun,¹ in a continuation of the previous study by Rhodes and Calhoun, converted raw scores from that study into grade placement scores. The converted scores indicated that the reading levels of the participating students ranged from seventh grade to college. Calhoun and Calhoun then determined the reading levels of the textbooks available to these students.

The Flesch Reading Ease formula was utilized in order to determine the readability of four leading bookkeeping textbooks. The average readability score of each textbook was

¹Calfrey C. Calhoun and Marjorie R. Calhoun, "Comparison of the Readability Level of High School Bookkeeping Textbooks with the Reading Achievement of Bookkeeping Students," Business Education Forum, XXII (April, 1968), 21-23.

between the tenth and twelfth grades, which was appropriate for eleventh and twelfth grade students, but the readability scores of each textbook ranged from sixth grade through college graduation. Since many parts of each textbook were inappropriate for eleventh and twelfth grade students, Calhoun and Calhoun recommended that teachers utilize a variety of instructional materials and possibly a variety of bookkeeping courses (recordkeeping, bookkeeping, and accounting) in order to help students develop meaningful bookkeeping concepts.

Anderson¹ determined the grade placement of 28 general business training textbooks via the Yoakam and Flesch Reading Ease formulas. The researcher also presented 531 business terms to a jury of 20 business education leaders in an effort to determine which words should be included in ninth grade general business vocabulary study.

Discrepancies in the reading levels of the general business training textbooks resulted when the two readability formulas were applied. According to the Flesch Reading Ease formula, 18 of the 28 textbooks were too difficult for ninth

¹George W. Anderson, "A Study of the Readability of General Business Training Textbooks." (unpublished Ed.D. dissertation, University of Pittsburgh, 1955) cited by Dissertation Abstracts, XV, p. 745.

grade students. According to the Yoakam formula, 2 of the 28 textbooks were too difficult and 7 were too easy for ninth grade students.

The jury of business education leaders indicated that almost all of the business terms judged had technical meanings, and Anderson determined that nontechnical words caused as much reading difficulty as technical words. As a result of the study, Anderson recommended that teachers prepare general business study materials which include both technical and nontechnical vocabulary.

Hopkins and Kim¹ also studied the readability of general business textbooks. The researchers recommended that teachers consider the readability of textbooks in addition to physical makeup, teaching/learning aids, and subject matter content when selecting general business textbooks.

The Flesch Reading Ease formula was utilized in order to determine the readability of three general business textbooks. The results indicated a wide range of variability in the reading levels within each textbook. The first textbook, which had the lowest average reading level, ranged from fifth grade

¹Charles R. Hopkins and Paul Y. Kim, "Textbook Reading Levels," Business Education Forum, XXVIII (May, 1974), 38-40.

through high school or some college; the second textbook, which had the highest average reading level, ranged from sixth grade through college; and the third textbook, which had the middle average reading level, ranged from sixth grade through high school or some college.

Hopkins and Kim recommended that teachers adopt more than one general business textbook. The researchers also recommended that teachers apply the Flesch Reading Ease formula to supplementary classroom reading materials.

Zahniser¹ studied the readability of economics textbooks at the secondary school level. The Flesch Reading Ease and Yoakam formulas were utilized to evaluate 30 economics textbooks which had been published between January 1, 1930, and December 31, 1954. The average grade placement was 10.94 according to the Flesch Reading Ease formula and 10.75 according to the Yoakam formula. The grade placement range of the 30 textbooks was from 8.12 to 13.30, with an average grade placement of about the eleventh grade. Zahniser recommended that economics textbooks be evaluated in terms of readability since reading levels vary two or more grades

¹Kenneth Clair Zahniser, "The Readability of Economic Textbooks." (unpublished Ed.D. dissertation, University of Pittsburgh, 1955) cited by Dissertation Abstracts, XVI, p. 84.

above and below the eleventh grade. Zahniser also studied economics vocabulary. As a result of that part of the research, Zahniser concluded that most words which were unique to economics appeared consistently in the textbooks and were slightly more difficult than noneconomic words.

Goodman¹ studied the readability of 28 high school business law textbooks which were published between 1930 and 1955 via the Yoakam readability formula. Goodman also prepared a list of legal terms to serve as a basis of vocabulary study in business law classes. This list was presented to a jury of 20 business law teachers and to a jury of 20 lawyers in order to determine which words were important to the citizenry.

The results of the study indicated that the grade levels of the 28 business law textbooks ranged from 9.0 to 12.8; that 67.9 percent of the textbooks were not too difficult for most eleventh grade students. Only a slight difference in difficulty existed between legal and nonlegal words, which indicated that general vocabulary caused about as much difficulty as legal vocabulary.

The jury of business law teachers indicated that 75 percent of the 361 legal terms should be taught in business law

¹David Gerson Goodman, "A Study of the Readability of High School Business Law Textbooks." (unpublished Ed.D. dissertation, University of Pittsburgh, 1956) cited in Dissertation Abstracts, XVII, pp. 61-62.

classes because of value to the citizenry; the jury of lawyers indicated that 73 percent of these terms should be taught. Goodman recommended that teachers consider using more than one textbook in a class to provide for different reading abilities and that vocabulary training be conducted for both legal and general vocabulary.

Henshall¹ sought to determine whether any one of four selected readability formulas predicted difficulty of shorthand dictation materials, whether any combination of the four selected readability formulas predicted difficulty of such materials more accurately or more easily than the Uthe shorthand formula, and whether the four selected readability formulas were more reliable than the shorthand formula. Henshall concluded that no single readability formula was equal or superior to the shorthand formula, but that all combinations of the readability formulas were significantly predictive of the difficulty of shorthand dictation materials. The readability formulas produced better, faster predictions of the difficulty of shorthand dictation materials than the shorthand formula.

¹Joy Lanier Henshall, "An Application of Readability Techniques to Prediction of Difficulty Level of Shorthand Dictation Materials." (unpublished Ph.D. dissertation, North Texas State University, 1971) cited by Dissertation Abstracts International, XXXII, p. 1980-A.

Peterson¹ studied, among other areas, the readability of selected business communications via the Gunning and Flesch Reading Ease formulas. After copies of 300 business letters were obtained from 15 companies, a jury of five business communications specialists determined the best 20 percent and the worst 20 percent of the letters. The two groups (each composed of 60 letters) were then analyzed for readability and other factors. The readability level of the best letters was 11.65 (eleventh grade level) according to the Gunning formula and 54.84 (tenth grade level) according to the Flesch Reading Ease formula. The readability level of the worst letters was 12.67 (twelfth grade level) according to the Gunning formula and 51.42 (eleventh grade level) according to the Flesch Reading Ease formula. Other pertinent factors included: 49 of the best letters and 27 of the worst letters featured an organizational plan; the best letters averaged 168 words and the worst letters averaged 94 words; all 60 of the best letters exhibited a positive tone, while only 28 of the worst letters presented a positive tone; 25 of the best letters and 37 of the worst letters contained

¹Dean Andrew Peterson, "A Study of Readability and Other Factors of Selected Business Communications." (unpublished Ed.D. dissertation, University of Southern California, 1959) cited by Dissertation Abstracts, XX, p. 565.

major punctuation errors; and 8 of the best letters and 31 of the worst letters included stereotyped expressions.

Peterson concluded that the selected business letters averaged between tenth and twelfth grade reading levels. The researcher recommended that business communications students be taught how to use readability formulas and that teachers emphasize the importance of an organizational plan, a positive tone, proper grammar and punctuation, and concise writing which is clear and complete.

Lacho, Stearns, and Villere¹ indicated that textbook selection affects the learning process. The researchers utilized the Flesch Reading Ease formula to determine the readability of marketing textbooks at the college level. Twenty-six introductory and seven advanced textbooks were included in the study. The introductory textbooks were found to be less appropriate for the intended audience than the advanced textbooks. Lacho, Stearns, and Villere urged teachers to consider readability when selecting textbooks, encouraged publishers to edit textbooks for readability, and

¹Kenneth J. Lacho, G. Kent Stearns, and Maurice F. Villere, "An Analysis of the Readability of Marketing Textbooks." Paper read before the meeting of the Southwestern Marketing Association, Houston, March 6, 1975.

challenged authors to apply the marketing concept by writing textbooks for particular audiences.

Readability Formulas

A readability formula is "a method of measurement intended as a predictive device that will provide quantitative, objective estimates of the style difficulty of writing."¹ Before teachers rely on such predictive devices for assistance in selecting accounting textbooks, consideration must be directed to several characteristics of such formulas.

Reliability

Reliability is a measuring instrument's precision, dependability, predictability, consistency, and stability.² When utilizing readability formulas, teachers must consider the reliability of such formulas by answering the following questions: (1) Will the samples which are measured represent the entire piece of writing with maximum accuracy? and (2) Will two or more measurements of the same samples agree closely, even if conducted by different people?³

¹Klare, The Measurement of Readability, p. 3.

²Kerlinger, Foundations of Behavioral Research, pp. 442-443.

³Klare, The Measurement of Readability, p. 101.

Lively and Pressey established the precedent of sampling when utilizing readability formulas.¹ Sampling reliability affects readability scores, so the optimum sample size must be selected for use in a particular study. Large samples offer no assurance of reducing sampling error, but a larger random sample usually results in less sampling error than a smaller random sample.² Sample size usually should be larger when (1) the number of different words or percentage of words in a given category is utilized, (2) the measurement must be highly accurate, and (3) sufficient time is available for conducting the measurement.³

A certain degree of human error is probably unavoidable when applying readability formulas. If formulas are considered to have analyst reliability, the same person must agree, on a second count, with the original count and/or another person must agree with the original count.⁴

¹Bertha A. Lively and S. L. Pressey, "A Method for Measuring the 'Vocabulary Burden' of Textbooks," Educational Administration and Supervision, IX (October, 1923), 389-398.

²Irvin J. Lehmann and William A. Mehrens, eds., Educational Research: Readings in Focus (New York: Holt, Rinehart and Winston, Inc., 1971), p. 19.

³Klare, The Measurement of Readability, p. 106.

⁴Ibid., pp. 106-107.

Analyst reliability is increased by selecting readability formulas which are as easy to apply as possible.

Validity

Validity is the success which a measuring instrument has in measuring what the measuring instrument is supposed to measure.¹ When utilizing readability formulas, teachers must consider the validity of such formulas by answering the following question: Will the results of formulas actually predict readability?² Three types of validity are important in predicting readability: (1) the degree to which formulas predict the original criterion scores used in developing the formulas, (2) the degree to which different formulas agree with each other, and (3) the degree to which formulas agree with outside criteria such as reading comprehension.³

Correlation is the statistical test used most frequently to explore the relationship between readability formulas and the accuracy of such formulas in predicting reading levels of passages used in the development of the formulas.⁴ Most readability formulas have a correlation coefficient of

¹Kerlinger, Foundations of Behavioral Research, p. 457.

²Klare, The Measurement of Readability, p. 101.

³Ibid., pp. 111-112.

⁴Ibid., p. 112.

approximately .70. A correlation coefficient of .70 indicates that such formulas account for about 50 percent of the variability in the passages used in the development of the formulas and that such formulas predict reading levels accurately to within approximately one grade level of actual reading levels.¹ Reading comprehension is the original criterion used in the development of most readability formulas and is usually measured by the McCall-Crabbs' Standard Test Lessons in Reading. The set of graded reading passages has become the most popular and satisfactory criterion available for use in constructing readability formulas.² Readability formulas are constructed to predict the average grade level of a student who answers correctly a certain percentage of test questions about these passages.³

The degree to which different readability formulas agree with each other varies considerably. The variability is caused by several factors: (1) different people utilize different materials and formulas when conducting comparative studies, (2) some formulas produce grade level scores automatically,

¹Ibid., p. 5.

²Ibid., p. 32.

³Rudolf Flesch, "A New Readability Yardstick," Journal of Applied Psychology, XXXII (June, 1948), 222.

while others must be adjusted in order to determine grade level scores, (3) different formulas are based on different criteria (i.e., a criterion of C_{50} indicates that 50 percent of the test passage questions are answered correctly and a criterion of C_{75} indicates that 75 percent of the test passage questions are answered correctly), and (4) most of the comparative studies have been correlational in nature, but some have utilized rank-order correlation procedures and others have utilized product-moment correlation procedures.¹

Readability formulas must also be validated against outside criteria such as reading comprehension, reading speed, judgments, readership, listenability, and writer characteristics. Reading comprehension is perhaps the most vital outside criterion since readability formulas are predictive devices utilized in order to increase understanding and learning. There are two common approaches to outside validity: (1) utilize existing criteria other than those employed in the development of a formula (i.e., different graded passages) and (2) compare materials constructed according to readability principles with the effect of such materials on reading comprehension.²

¹Klare, The Measurement of Readability, pp. 119-120.

²Ibid., pp. 121-122.

Limitations

Given readability formulas are reliable and valid, but teachers must recognize that such formulas do not produce absolute results; rather, readability formulas are probability statements.¹ Teachers should utilize such formulas in conjunction with other textbook selection criteria. One recommended textbook evaluation plan consists of six steps:

1. Observe the format.
2. Note the literary form.
3. Read the book slowly for content.
4. Observe the author's style.
5. Predict the difficulty of the book by taking sample passages, analyzing them for significant elements, and applying a formula of prediction.
6. Bring together all the facts about the book and relate them to all the facts known about the reader to determine whether the book is suited to his interests, abilities, and purpose.²

Such an evaluation plan precludes textbook selection based solely on readability formulas.

¹Allen M. Blair, "Everything You Always Wanted to Know about Readability but Were Afraid to Ask," Elementary English, XLVIII (May, 1971), 442.

²Theodore L. Harris, "Making Reading an Effective Instrument of Learning in the Content Fields," Reading in the High School and College, Forty-Seventh Yearbook of the National Society for the Study of Education, Part II (Chicago: The University of Chicago Press, 1948), p. 129.

Readability formulas are criticized most often because such formulas do not measure contextual difficulty, abstractness and density of ideas, student interest in a subject, organization, size of type, length of line, spacing, kind of ink and paper,¹ student health, religion, ethnic background, or what the student had for breakfast.² Although readability formulas are not perfect, such formulas do serve a useful purpose. That is,

without some reliable measure of difficulty those who need to be able to match reader ability and difficulty level can rely only on judgment. Trained judgment can be good, but there is general agreement that, even with its limitations, a good formula can be better.³

Teachers must remember that:

1. Formulas measure only one aspect of writing-- style.
2. Formulas measure only one aspect of style-- difficulty.

¹Blair, "Everything You Always Wanted to Know about Readability but Were Afraid to Ask," 442.

²Sylvia-Lee Tibbetts, "How Much Should We Expect Readability Formulas to Do?" Elementary English, L (January, 1973), 75.

³Mavis Martin, "Refinement of a Readability Formula," Problems, Programs, and Projects in College-Adult Reading, Eleventh Yearbook of the National Reading Conference (Milwaukee, Wisconsin: The National Reading Conference, Inc., 1962), p. 132.

3. Formulas do not even measure difficulty perfectly.

4. Formulas are not measures of good style.¹

It is impractical to continually test students' reading levels, but educational levels, which are usually related to reading levels and intellectual levels,² are available as estimates of reading levels. When teachers understand the limitations of readability formulas and use such formulas to provide "quantitative, objective estimates of difficulty for pieces of writing without requiring readers to take tests of any kind on them,"³ readability formulas are available as estimates of textbook difficulty. Teachers who utilize both types of information in textbook selection effectively match the difficulty level of textbooks and the reading ability of students.

Selection

Klare listed 31 formulas, published between 1923 and 1959, which met his criteria for measuring readability.⁴ Additional readability formulas have been developed since

¹Klare, The Measurement of Readability, pp. 24-25.

²Ibid., p. 12.

³Ibid., pp. 33-34.

⁴Ibid., p. 4.

that time. Teachers must select, from the many formulas which are available, a formula which provides appropriate information prerequisite to the selection of accounting textbooks which encourage student success.

The Flesch Reading Ease, Dale-Chall, and Lorge readability formulas are probably used more often than any other formulas at the high school, adult, and college levels.^{1,2} Each of these formulas was based on the McCall-Crabbs' Standard Test Lessons in Reading,³ but teachers probably should select either the Flesch Reading Ease or Dale-Chall formula when accuracy is more important than ease of computation.⁴

Both the Flesch Reading Ease and Dale-Chall formulas are appropriate for use with adult materials,⁵ although the Flesch Reading Ease formula tends to underrate grade level to an

¹Albert J. Kingston and Wendell W. Weaver, "Recent Developments in Readability Appraisal," Journal of Reading, XI (October, 1967), 45.

²John U. Michaelis and Fred T. Tyler, "A Comparison of Reading Ability and Readability," The Journal of Educational Psychology, XLII (December, 1951), 491.

³R. D. Powers, W. A. Sumner, and B. E. Kearl, "A Recalculation of Four Adult Readability Formulas," Journal of Educational Psychology, XLIX (April, 1958), 99.

⁴Ibid., 104.

⁵Klare, The Measurement of Readability, p. 60.

increasing degree after the seventh grade.¹ While the Dale-Chall formula is considered by a slight margin to be the most accurate formula available,² the Flesch Reading Ease formula is the most popular.³

Teachers probably should use the Flesch Reading Ease formula in determining the readability of accounting textbooks. Characteristics of the Flesch Reading Ease formula which must be considered in detail include reliability, validity, and lack of dependence upon a word list.

Reliability.--The Flesch Reading Ease formula has a high degree of analyst reliability. Several studies have indicated that the formula is highly reliable in this respect, including one which concluded that:

for practical purposes the Flesch formulas and the directions for their use are sufficiently objective to be used even by inexperienced analysts to obtain estimates of the reading ease and human interest of written material.⁴

¹Flesch, "A New Readability Yardstick," 225.

²Powers, Sumner, and Kearl, "A Recalculation of Four Adult Readability Formulas," 104.

³Klare, The Measurement of Readability, p. 23.

⁴Patricia M. Hayes, James J. Jenkins, and Bradley J. Walker, "Reliability of the Flesch Readability Formulas," Journal of Applied Psychology, XXXIV (February, 1950), 26.

Validity.--The Flesch Reading Ease formula is based on the most satisfactory criterion for the development of readability formulas--the McCall-Crabbs' Standard Test Lessons in Reading.¹ The multiple correlation coefficient of the Flesch Reading Ease formula with the 1926 edition of these test passages was .70. The multiple correlation coefficient of the Flesch Reading Ease formula with the 1950 revised edition of these test passages decreased slightly to .64.² The decrease is based on a coefficient of multiple determination of .4034.³ The Flesch Reading Ease formula is considered to have a relatively high validity with either the 1926 or the 1950 edition of the Lessons as the criterion.⁴

The validity of the Flesch Reading Ease formula in relation to other formulas is excellent. The formula has been involved in comparisons with other formulas more frequently than any other formula. Such comparisons have resulted in intercorrelations as high as .98 with the Dale-Chall formula.

¹Flesch, "A New Readability Yardstick," 222-223.

²Klare, The Measurement of Readability, pp. 70-71, 113.

³Powers, Sumner, and Kearl, "A Recalculation of Four Adult Readability Formulas," 101.

⁴Klare, The Measurement of Readability, p. 113.

The grade level scores of the Flesch Reading Ease formula have been most comparable to Dale-Chall scores.¹

Word List.--The Dale-Chall formula produces the smallest error and highest prediction power of all readability formulas. The Dale-Chall formula also requires utilization of a word list. Such word lists seldom contain technical vocabulary, become dated, and need frequent revision and validation.² The Flesch Reading Ease formula, which does not rely upon a word list, is the best statistical formula for teachers to use in determining the readability of technical textbooks.

Flesch Reading Ease Formula.--The Flesch Reading Ease formula is the formula of choice in determining the readability of accounting textbooks. The Flesch Reading Ease formula is reliable and valid, is the best formula statistically of those not using a word list,^{3,4} incorporates the writing style factors which are most efficient in predicting

¹Ibid., pp. 117-118.

²Martin, "Refinement of a Readability Formula," p. 133.

³Klare, The Measurement of Readability, p. 71.

⁴Powers, Sumner, and Kearl, "A Recalculation of Four Adult Readability Formulas," 104.

the readability of technical materials,¹ and is relatively simple and easy for teachers to use.²

Summary

Because related studies provide useful background information, Chapter II reviews several studies which concern the readability of business textbooks and other instructional materials. Chapter II also reviews certain characteristics of readability formulas. Such information is intended to assist those teachers who want to select textbooks, via a readability formula, which encourage student success in accounting.

Chapter III reports the methodology involved in exploring the readability of selected high school, vocational, and college accounting textbooks. The methodology is dictated by the demands of the research design and the Flesch Reading Ease formula.

¹John S. Caylor, et al., Methodologies for Determining Reading Requirements of Military Occupational Specialties (Alexandria, Virginia: Human Resources Research Organization, March, 1973), pp. 15-17.

²Hopkins and Kim, "Textbook Reading Levels," 39.

CHAPTER III

METHODOLOGY

Introduction

In order to explore the readability of selected accounting textbooks, the Flesch Reading Ease formula was applied to random samples from each textbook. The following methods were used for selecting the textbooks, selecting the samples, collecting the data, applying the formula, selecting the statistical tests, and analyzing the data.

Accounting Textbooks

A list of available high school, vocational, and college accounting textbooks was developed from publishers' catalogues. Representatives of each publisher were contacted in order to obtain any additional information which was not included in the catalogues concerning new textbooks or new editions of textbooks. When these procedures were completed, the final list of available textbooks included three high school, three vocational, and numerous college accounting textbooks.

Three accounting textbooks were available which were designed for high school students:

Boynton, Lewis D., et al. Century 21 Accounting. Cincinnati: South-Western Publishing Co., 1972.

Freeman, M. Herbert, et al. Accounting 10/12. 2nd ed. New York: Gregg Division, McGraw-Hill Book Company, 1973.

Miller, Morris, and Janis, Arthur. Modern Bookkeeping and Accounting. 2nd ed. New York: Pitman Publishing Corporation, 1973.

Three accounting textbooks were available which were designed for vocational/adult students:

Boynton, Lewis D., et al. Fundamentals of Accounting: Adult and Continuing Education Series. Cincinnati: South-Western Publishing Co., 1972.

Brock, Horace R., Palmer, Charles E., and Archer, Fred C. Accounting: Basic Principles. 3rd ed. New York: McGraw-Hill Book Company, 1974.

Carson, A. B., and Carlson, Arthur E. College Accounting. 9th ed. Cincinnati: South-Western Publishing Co., 1972.

Since numerous accounting textbooks were available which were designed for college students at the principles level, the criterion used for the selection of college accounting textbooks was the extent of adoptions. Four of the available textbooks accounted for 53 percent of all adoptions in American Association of Collegiate Schools of Business,¹ but one of

¹Merrill B. Dilley, "Textbooks Used in Accounting Courses," The Accounting Review, XLII (October, 1967), 801.

these four textbooks has been replaced by a new edition which was authored by a different team. The popularity of the new edition has not been documented and the new edition was not included in the study. Three textbooks were selected for the study based on adoptions:¹

Meigs, Walter B., Mosich, A. N., and Johnson, Charles E. Accounting: The Basis for Business Decisions. 3rd ed. New York: McGraw-Hill Book Company, 1972. (The edition which was current in 1967 had 13 adoptions.)

Niswonger, C. Rollin, and Fess, Philip E. Accounting Principles. 11th ed. Cincinnati: South-Western Publishing Co., 1973. (The edition which was current in 1967 had 19 adoptions.)

Pyle, William W., and White, John Arch. Fundamental Accounting Principles. 6th ed. Homewood, Illinois: Richard D. Irwin, Inc., 1972. (The edition which was current in 1967 had 16 adoptions.)

The fourth widely adopted textbook, authored by Finney and Miller, also had 13 adoptions in 1967. The textbook was adopted as often as the textbook by Meigs, Mosich, and Johnson:

Finney, H. A., and Miller, Herbert E. Principles of Accounting: Introductory. 6th ed. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963.

Since the sixth edition of Finney and Miller is not current, adoptions have diminished. The seventh edition, which was authored by a new team, has replaced the sixth edition:

¹Ibid.

Johnson, Glenn L., and Gentry, James A., Jr. Finney and Miller's Principles of Accounting. 7th ed. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970.

The study was designed to provide information about the publishers of selected accounting textbooks in addition to information about the levels of selected accounting textbooks. Publisher 1 and Publisher 2 had a textbook represented at each level, but Publisher 3 did not have a textbook represented at each level. The textbooks of Publisher 1 and Publisher 2 were compared in order to obtain beneficial information about publishers. The study was also designed to examine the relationship between the reading difficulties of accounting textbooks at each level and the publishers of the textbooks. Such analysis determined, for example, whether a publisher produced the most difficult high school textbook and the least difficult college textbook.

Sample Selection

The optimum number of samples must be efficient, representative, reliable, and flexible.¹ Prior research has indicated that sampling of 100-word passages is appropriate when

¹Mildred Parten, Surveys, Polls, and Samples: Practical Procedures (New York: Harper & Brothers, Publishers, 1950), p. 293.

determining the readability of books.¹ While sampling is indicated when textbooks are involved, the type of statistical test to be utilized must be considered when determining the appropriate number of samples to be chosen from each textbook.² The sampling procedure must be both representative of the textbooks being measured and responsive to the statistical analysis being planned. A long textbook is best represented by a large number of 100-word samples,³ but a large sample results in an analysis of variance with the power to detect very small differences and label them as significant.⁴

In order to satisfy the demands of both readability and statistical analysis, a technique was adopted which is used when measuring short publications. Prior research has indicated that the readability of magazine articles is successfully determined by measuring samples from each article.⁵

¹Martin, "Refinement of a Readability Formula," pp. 135-137.

²Parten, Surveys, Polls, and Samples: Practical Procedures, p. 298.

³Martin, "Refinement of a Readability Formula," p. 137.

⁴Lehmann and Mehrens, Educational Research: Readings in Focus, p. 19.

⁵Kenneth L. Dulin, "Readability Levels of Adult Magazine Material," The Psychology of Reading Behavior, Eighteenth Yearbook of the National Reading Conference (Milwaukee, Wisconsin: The National Reading Conference, Inc., 1969), pp. 177, 179.

In the study, each chapter of a textbook was identified as a unit comparable to a magazine article and three samples were taken from each randomly selected chapter.

A procedure based upon the power needed for the analysis of variance was used in order to determine the number of chapters to be randomly selected from each textbook.¹ Each textbook was regarded as one cell in the design for the analysis of variance. The research design, as indicated in Figure 1, involved the levels, the publishers, and the number of chapters selected from each textbook.

	Publisher 1	Publisher 2	Publisher 3
High School	N = 6 Chapters	N = 6 Chapters	N = 6 Chapters
Vocational	N = 6 Chapters	N = 6 Chapters	N = 6 Chapters
College	N = 6 Chapters	N = 6 Chapters	N = 6 Chapters

Fig. 1.--Research Design

In determining the optimum number of samples to be used in conjunction with the analysis of variance, two assumptions

¹Roger E. Kirk, Experimental Design: Procedures for the Behavioral Sciences (Belmont, California: Brooks/Cole Publishing Company Division, Wadsworth Publishing Company, Inc., 1968), pp. 107-110.

were made. The first assumption concerned the appropriate size of the standard deviation. Since the standard error for the Flesch Reading Ease formula has been calculated to be .85 grade levels,¹ a standard deviation of 1.5 was large enough to indicate a difference which was larger than the standard error of the formula. The second assumption concerned the probability of making a Type II error. A Type II error occurs when a significant difference is not detected. An .05 level of significance was selected because that level of significance indicates a 5 percent chance of rejecting the null hypothesis when the null hypothesis should be accepted and a 95 percent chance of accepting the null hypothesis when the differences are real.²

The optimum number of samples for the analysis of variance was determined to be six samples per cell. Each observation consisted of three 100-word samples which represented a chapter. Each textbook was represented by eighteen 100-word samples, which provided a good indication of the reading level of a textbook. The total sample size for the study was

¹Powers, Sumner, and Kears, "A Recalculation of Four Adult Readability Formulas," 101.

²Lehmann and Mehrens, Educational Research: Readings in Focus, p. 16.

one hundred sixty-two 100-word samples. These samples were distributed among the textbooks as follows: six chapters were randomly selected from each of the nine textbooks and three samples were selected from each of the chapters ($6 \times 9 \times 3 = 162$).

A table of random numbers was employed to determine which chapters to utilize in each textbook. The three samples from each chapter were selected in the following manner: the first page, the last page, and a middle page. The middle page was calculated by subtracting the first page number of the chapter from the last page number, adding one, and dividing by two. The result was the number of pages between the first sample and the middle sample.

If there was not a 100-word sample on the first page of a chapter, the first following page which had a 100-word sample was utilized. If there was not a 100-word sample on the last page of a chapter, the first preceding page which had a 100-word sample was utilized. If there was not a 100-word sample on the middle page of a chapter, the first following page which had a 100-word sample was utilized; if a following page could not be utilized, the first page which preceded the middle page and had a 100-word sample was utilized.

Collection of Data

All data used in the study were obtained from the nine selected accounting textbooks and consisted of the aforementioned one hundred sixty-two 100-word samples. When the data were analyzed, the three samples selected from each chapter were combined in order to determine one readability score (in terms of grade level) for each chapter. In determining each 100-word sample, the following rules governed:

1. Each sample began with the first complete sentence at the top of the page.
2. Numbers were counted as one word.
3. Acronyms were counted as one word.
4. Hyphenated words were counted as one word.
5. Contractions were counted as one word.¹

These counting procedures were duplicated for increased accuracy.

After determining the 100-word samples, the Flesch Reading Ease formula specifies that each sample be subjected to three additional counts:

1. The number of words to the end of the sentence closest to the end of the 100-word sample--the number could be greater than or less than 100.

¹Rudolf Flesch, The Art of Readable Writing (New York: Harper & Brothers, Publishers, 1949), p. 213.

2. The number of sentences closest to the end of the sample. Each sentence should have a complete thought, but a sentence could end with a period, with a colon, or with a semicolon.

3. The number of syllables in the 100-word sample.¹ These counting procedures were duplicated for increased accuracy.

The Flesch Reading Ease formula specifies that the number of syllables in each 100-word sample be counted (Step 3). Counting syllables is the greatest area for human counting error because of the tedious procedure of dividing each word into syllables. One modification was made to the Flesch Reading Ease formula in order to increase the accuracy of the formula. Instead of counting the number of syllables in each 100-word sample, the number of letters in each 100-word sample was counted. The number of letters was divided by 3.1127 in order to determine the number of syllables in each 100-word sample. Such a modification was possible because research has indicated that the average syllable is composed of

¹Ibid., pp. 213-214.

3.1127 letters.^{1,2} Determining the number of syllables via the modification correlates .98 with actual syllable counts.^{3,4} Vowels per word, consonants per word, and letters per word have also been employed in an attempt to estimate the average number of syllables in each 100-word sample. These estimates have lower correlations with actual syllable counts (.92, .78, and .88 respectively)⁵ than the method selected for the study.

Application of Formula

There are two versions of the Flesch Reading Ease formula. The first version of the formula predicts the grade level of a given passage:

¹Norman A. Felsenthal and Helen Felsenthal, "Utilizing the Computer to Assess the Readability of Language Samples." Paper read before the meeting of the American Education Research Association, Chicago, April 6, 1972.

²G. Wayne Shamo, "Utilizing Readability Formulas to Predict Listenability." Paper read before the meeting of the American Education Research Association, New Orleans, February 27, 1973.

³Felsenthal and Felsenthal, "Utilizing the Computer to Assess the Readability of Language Samples."

⁴Shamo, "Utilizing Readability Formulas to Predict Listenability."

⁵Esther U. Coke and Ernst Z. Rothkopf, "Note on a Simple Algorithm for a Computer-Produced Reading Ease Score," Journal of Applied Psychology, LIV (June, 1970), 208-209.

$$C_{75} = .0846w_1 + .1015s_1 - 5.6835$$

where

C_{75} = the average grade of students who could answer three-fourths of the test questions correctly

w_1 = word length (syllables per 100 words)

s_1 = sentence length in words.

The first version of the formula results in a grade level figure and was deemed most appropriate in the study.¹

The second version of the formula yields scores which range from 0 to 100 with 100 being the easiest reading level:

$$RE = 206.835 - .846w_1 - 1.015s_1$$

where

w_1 = word length (syllables per 100 words)

s_1 = sentence length in words.

A score of 100 indicates that students with a fourth-grade education could answer correctly three-fourths of the test questions concerning a passage the students read. The only difference between the two versions of the formula is that the first version, which predicts grade level, was adjusted mathematically in order to obtain a prediction of reading ease.²

¹Flesch, "A New Readability Yardstick," 224-226.

²Ibid.

Appendix A contains the forms which indicate the application of the Flesch Reading Ease formula to the data collected from the selected accounting textbooks. The information is summarized in Tables 1, 2, and 3 which indicate the resulting readability score of each chapter from each textbook. Readability is expressed in terms of grade level.

Statistical Tests

The general problem of the study (to explore the readability of selected accounting textbooks) dictated the statistical tests. In order to explore the differences among the levels and publishers of high school, vocational, and college accounting textbooks, two-way analysis of variance was indicated. Analysis of variance was the appropriate statistical method because analysis of variance is "a method of identifying, breaking down, and testing for statistical significance variances that come from different sources of variation."¹ Two-way analysis of variance was appropriate in order to determine variance among levels, among publishers, and interaction between the two.

In conjunction with analysis of variance, Scheffé tests for post hoc analysis were conducted. These tests identified

¹Kerlinger, Foundations of Behavioral Research, p. 147.

TABLE 1

READABILITY OF HIGH SCHOOL TEXTBOOKS

		Readability (Grade Level)
Chapter		
Book 1	A	8.52
	B	8.09
	C	9.09
	D	8.88
	E	9.34
	F	8.65
Book 2	A	10.01
	B	9.97
	C	8.45
	D	9.24
	E	9.54
	F	9.74
Book 3	A	10.01
	B	9.76
	C	9.96
	D	8.89
	E	9.03
	F	9.35

TABLE 2

READABILITY OF VOCATIONAL TEXTBOOKS

		Readability (Grade Level)
Chapter		
Book 1	A	8.86
	B	8.67
	C	9.86
	D	10.15
	E	11.04
	F	10.45
Book 2	A	10.22
	B	10.13
	C	9.66
	D	10.13
	E	10.10
	F	9.18
Book 3	A	8.44
	B	9.33
	C	8.81
	D	8.94
	E	9.49
	F	10.04

TABLE 3

READABILITY OF COLLEGE TEXTBOOKS

		Readability (Grade Level)
Chapter		
Book 1	A	10.38
	B	10.53
	C	10.89
	D	11.11
	E	8.85
	F	10.49
Book 2	A	10.31
	B	9.92
	C	8.77
	D	10.45
	E	10.83
	F	9.84
Book 3	A	10.60
	B	9.53
	C	9.81
	D	10.36
	E	9.68
	F	10.09

any differences among reading levels indicated by a significant F-ratio.

Hartley's F_{\max} test for homogeneity of variance was conducted. The test determined the existence of a wider range of readability within certain textbooks than within others.

Analysis of Data

The data were analyzed via two computer program packages. One program from the UCLA Biomedical Series was used. The output of the Elementary Statistics package, BMD01D, included the mean, standard deviation, standard error, sample size, and sample range with maximum and minimum scores for each variable.

A program from the EDSTAT-V package was also used. The output of the analysis of variance package, AVAR23, included the mean squares, degrees of freedom, F-ratio, and probability for levels, publishers, and levels/publishers, the means for all effects, and the cell characteristics, including the number, mean, and standard deviation for each cell.

The Scheffé and Hartley's F_{\max} statistical tests were completed via a desk calculator. Calculations were duplicated for increased accuracy.

Summary

Appropriate methodology is prerequisite to the exploration of the readability of selected high school, vocational, and college accounting textbooks. Chapter III reports the methodology involved in planning the research design (selection of the textbooks, the samples, and the statistical tests, and data analysis) and in implementing the Flesch Reading Ease formula (collection of the data and application of the formula).

Chapter IV presents the results of the statistical tests which were used to analyze the data. The results of the statistical tests determine the degree of confidence to place in the hypotheses.

CHAPTER IV

RESULTS

Introduction

The data which resulted from the application of the Flesch Reading Ease formula to samples from selected accounting textbooks were subjected to statistical tests. These statistical tests served as the basis for rejecting or failing to reject the hypotheses which explored the readability of the accounting textbooks.

Description of Data

The descriptions of central tendency and variability provided initial information about the variables of the study. The means and standard deviations were calculated and are presented in Table 4.

The mean readability scores indicated that the reading levels of the selected accounting textbooks increased in difficulty as the grade levels increased. The mean readability scores also indicated that the reading level of each

TABLE 4
MEANS AND STANDARD DEVIATIONS

Textbook	Publisher					
	Publisher 1		Publisher 2		Publisher 3	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
High School	8.76	.44	9.49	.58	9.50	.48
Vocational	9.84	.92	9.90	.41	9.18	.57
College	10.38	.80	10.02	.71	10.01	.41

of the textbooks was considerably below the grade level of the students for whom the textbook was written.

Analysis of Variance

Two-way analysis of variance results in the analysis of the main effects or independent variables (levels and publishers) and their interactive effects upon the dependent variable (reading level).¹

The first three hypotheses were designed to determine any significant difference among the reading levels of textbooks designed for high school, vocational, and college accounting students. Such difference could have been among levels, among publishers, or interaction between levels and publishers. These hypotheses were tested via two-way analysis of variance.

Table 5 indicates the results of the two-way analysis of variance. The F-ratio for levels (9.33) reached the level required for significance at the .01 level of probability. The F-ratio for interaction between levels and publishers (2.69) also reached the level required for significance at the .05 level of probability. The F-ratio for publishers (.71) did not reach the level required for significance at the .05 level of probability.

¹Ibid., pp. 244-245.

TABLE 5
RESULTS OF TWO-WAY ANALYSIS OF VARIANCE

Source	ss	df	ms	F
Total	28.75	53		
Levels	7.08	2	3.54	9.33**
Publishers	.54	2	.27	.71
Levels X Publishers	4.08	4	1.02	2.69*
Error	17.06	45	.38	

**
p < .01

*
p < .05

Stated in the null form, the first three hypotheses were:

H_{0_1} : There is no significant difference among the reading levels of textbooks designed for high school, vocational, and college accounting students.

The first hypothesis must be rejected because of a significant F-ratio for levels. There is a significant difference among the reading levels of textbooks designed for high school, vocational, and college accounting students.

H_{0_2} : There is no significant difference among the reading levels of accounting textbooks published by different publishers.

The second hypothesis must fail to be rejected because the F-ratio for publishers is not significant. There is no significant difference among the reading levels of textbooks published by different publishers.

H_{0_3} : There is no significant relationship between the reading difficulties of accounting textbooks at the three levels and the publishers of the textbooks.

The third hypothesis must be rejected because of a significant F-ratio for interaction. There is a significant relationship between the reading difficulties of textbooks for different levels and the publishers of the textbooks.

Figure 2 depicts the interaction between levels and publishers which was indicated by a significant F-ratio of 2.69

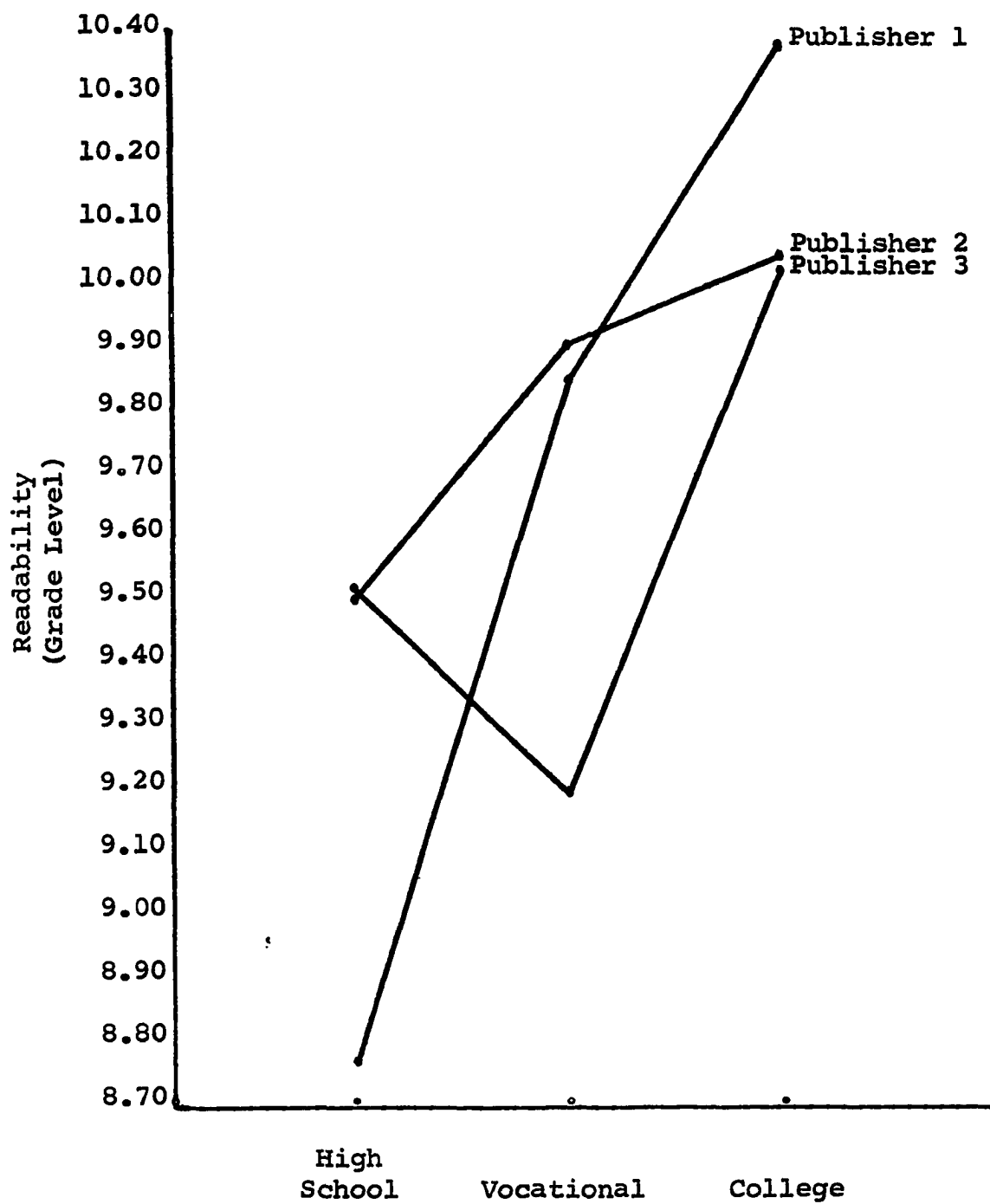


Fig. 2.--Interaction Between
Levels and Publishers

at the .05 level of probability. The interaction between Publisher 1 and Publisher 2 was significant because each of these publishers had a textbook represented at each level. The meaningful interaction between these two publishers signified that Publisher 1 produced the high school textbook with the lowest reading level and the college textbook with the highest reading level.

The interaction between Publisher 3 and Publisher 1 and between Publisher 3 and Publisher 2 was not significant because Publisher 3 was used to designate textbooks from three different publishers. The interaction represented a portion of the total significant F-ratio between levels and publishers, but had no practical significance.

Post Hoc Comparisons of Means

The Scheffe¹ post hoc test was conducted in order to identify and describe the differences which constituted the significant F-ratio for levels (9.33). The Scheffe¹ test can be applied to all significant F-ratios after an analysis of variance has been conducted.¹

The fourth, fifth, and sixth hypotheses were designed to isolate components of the significant F-ratio for levels.

¹Ibid., p. 235.

The .05 level of probability was acceptable because the Scheffé¹ post hoc test is a very conservative statistical measure. In order to attain significance, differences have to be rather substantial.¹ Table 6 indicates the results of the Scheffé.

TABLE 6
RESULTS OF SCHEFFÉ¹

Level	S-Score
High School/Vocational	9.36
Vocational/College	11.91
College/High School	21.27*

* $p < .05$

Table 6 indicates that neither the S-score for the high school/vocational level (9.36) nor the S-score for the vocational/college level (11.91) reached the level required for significance at the .05 level of probability. The S-score for the college/high school level (21.27) reached the level required for significance at the .05 level of probability.

¹Ibid.

Stated in the null form, these hypotheses were:

Ho₄: There is no significant difference between selected high school and vocational accounting textbooks.

The fourth hypothesis must fail to be rejected because the S-score is not significant at the .05 level of probability. There is no significant difference between selected high school and vocational accounting textbooks.

Ho₅: There is no significant difference between selected vocational and college accounting textbooks.

The fifth hypothesis must fail to be rejected because the S-score is not significant at the .05 level of probability. There is no significant difference between selected vocational and college accounting textbooks.

Ho₆: There is no significant difference between selected college and high school accounting textbooks.

The sixth hypothesis must be rejected because the S-score is significant at the .05 level of probability. There is a significant difference between selected college and high school accounting textbooks.

Homogeneity of Variances

Hartley's F_{\max} test for homogeneity of variance was conducted. The test was utilized to identify significant differences among the variabilities of the accounting textbooks.

The seventh hypothesis was designed to compare the variabilities among the reading levels for each textbook. Certain textbooks were expected to have a significantly greater range of reading levels than other textbooks. Table 7 indicates the variance.

TABLE 7
VARIANCE WITHIN TEXTBOOKS

Textbook	Level	Publisher	Variance
1	Vocational	1	.846
2	College	1	.640
3	College	2	.504
4	High School	2	.336
5	Vocational	3	.325
6	High School	3	.230
7	High School	1	.194
8	College	3	.168
9	Vocational	2	.168

$$F_{\max} = .846/.168 = 5.0357$$

$$df = 5$$

$$K = 9$$

Table 7 indicates that the variance among the reading levels for each textbook ranged from a high of .846 to a low of .168. The ratio between the largest and smallest variance was 5.0357.

Stated in the null form, the hypothesis was:

Ho₇: There is no significant difference among the variabilities of the reading levels of accounting textbooks.

The seventh hypothesis must fail to be rejected because the ratio between the largest and smallest variance did not reach the magnitude required for significance at the .05 level of probability. There is no significant difference among the variabilities of the reading levels of textbooks in accounting. No single textbook varied within itself to a greater extent than any other textbook varied within itself.

Summary

Statistical tests must be conducted in order to determine the degree of confidence to place in the hypotheses concerning the readability of selected high school, vocational, and college accounting textbooks. Chapter IV presents the results of the statistical tests which were utilized in rejecting or failing to reject the hypotheses.

Chapter V consists of the summary, conclusions, and recommendations concerning the readability of selected accounting

textbooks. Such information is intended to assist teachers who want to select textbooks, via a readability formula, which encourage student success in accounting.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The summary, conclusions, and recommendations which resulted from the exploration of the readability of selected accounting textbooks provide guidance to teachers. With such information readily available, teachers are in a better position to match the difficulty level of accounting textbooks and the reading ability of students.

Summary

The purpose of the study was to explore the readability of selected accounting textbooks. In addition to providing teachers with a comparison of the reading levels of selected high school, vocational, and college accounting textbooks, the exploration also provided a summary of certain characteristics of readability formulas and a method of applying a selected readability formula to accounting textbooks.

Procedures

Publishers' catalogues and representatives were utilized in order to compile a list of available high school, vocational, and college accounting textbooks. Three textbooks at each level were selected from the final list for inclusion in the study.

Random sampling of 100-word passages is appropriate when determining the readability of textbooks, but the sampling procedure must be both representative of the textbooks and responsive to the statistical analysis. In accordance with these demands, the optimum number of samples for the analysis of variance was determined to be six chapters per textbook. Three 100-word samples were selected from each chapter. The total sample size for the study was one hundred sixty-two 100-word samples (six chapters per textbook times three samples per chapter times nine textbooks). A table of random numbers was employed to determine which chapters to utilize in each textbook, and the three samples from each chapter were selected from the first page, middle page, and last page of each chapter.

A review of readability literature indicated that the Flesch Reading Ease formula was the most appropriate readability formula to use when determining the readability of accounting textbooks. The rules specified by Rudolf Flesch

for use with the Flesch Reading Ease formula were followed in determining each 100-word sample. One modification was made to the Flesch Reading Ease formula in order to decrease human counting errors and thus increase accuracy when applying the formula to each sample.

Two-way analysis of variance was the appropriate statistical test for use in the study because two-way analysis of variance identified significant differences among levels, among publishers, and interaction between the two. The Scheffé test for post hoc analysis and Hartley's F_{\max} test were also conducted in conjunction with the analysis of variance.

Results

The mean readability scores indicated that the reading levels of the selected accounting textbooks increased in difficulty as the grade levels increased. The mean readability scores also indicated that the reading level of each textbook was considerably below the grade level of the students for whom the textbook was written.

The two-way analysis of variance resulted in the analysis of the main effects or independent variables (levels and publishers) and their interactive effects upon the dependent variable (reading level).

The first three hypotheses were designed to determine any significant difference among the reading levels of high school, vocational, and college accounting textbooks. The F-ratios for levels and interaction were significant at the .01 and .05 levels of probability respectively. The F-ratio for publishers was not significant.

The next three hypotheses were designed to identify and describe differences which constituted the significant F-ratio for levels. The S-score for the college/high school level was significant at the .05 level of probability. The S-scores for the high school/vocational level and the vocational/college level were not significant at the .05 level of probability.

The last hypothesis was designed to determine the different variabilities among the accounting textbooks. The ratio between the largest and smallest variance did not reach the magnitude required for significance at the .05 level of probability.

Conclusions

The first hypothesis--that there is a significant difference among the reading levels of textbooks designed for high school, vocational, and college accounting students--was supported. Reading levels do vary with the students for whom the textbooks were designed.

The second hypothesis--that there is a significant difference among the reading levels of accounting textbooks published by different publishers--was not supported. Reading levels do not vary in different publishers' textbooks.

The third hypothesis--that there is a significant relationship between the reading difficulties of accounting textbooks at the three levels and the publishers of the textbooks--was supported. There is interaction between the levels of accounting textbooks and the publishers of the textbooks.

The fourth hypothesis--that there is a significant difference between selected high school and vocational accounting textbooks--was not supported. Textbooks designed for high school and vocational accounting students do not have significantly different reading levels.

The fifth hypothesis--that there is a significant difference between selected vocational and college accounting textbooks--was not supported. Textbooks designed for vocational and college accounting students do not have significantly different reading levels.

The sixth hypothesis--that there is a significant difference between selected college and high school accounting textbooks--was supported. Textbooks designed for college and high school accounting students do have significantly different reading levels.

The seventh hypothesis--that there is a significant difference among the variabilities of the reading levels of accounting textbooks--was not supported. The variability of reading levels within one accounting textbook is not greater than the variability of reading levels within other accounting textbooks.

Recommendations

Two kinds of recommendations logically resulted from the study. The first kind of recommendation concerns the utilization of readability formulas. The second kind of recommendation concerns further research.

Recommendations for Utilizing Readability Formulas

The following recommendations resulted from the study:

1. In an effort to match the difficulty level of accounting textbooks and the reading ability of students, teachers and textbook committees should apply a readability formula to accounting textbooks and other instructional materials before finalizing adoptions. Teachers in all business administration areas should apply a readability formula to textbooks and other instructional materials before finalizing adoptions.
2. Teachers should become familiar with the general characteristics of readability formulas. Teachers should be

especially cognizant of the fact that such formulas do not measure content; rather, readability formulas measure the difficulty of writing style.

3. Easier methods are available for determining readability, but teachers should utilize the Flesch Reading Ease formula when determining the readability of accounting textbooks and other instructional materials. Use of the Flesch Reading Ease formula has been established as relatively precise and appropriate for use with technical materials.

4. Teachers should identify reading assignments which include terms with specialized, exact, and extensive meanings in accounting. Teachers should conduct intensive vocabulary training on those terms.

5. Teachers should recognize that textbooks which have reading levels commensurate with educational levels are not necessarily textbooks which students can read with understanding. Because reading abilities of many students are actually below educational levels, teachers should select textbooks which have reading levels commensurate with reading abilities rather than reading levels commensurate with educational levels.

6. Readability is only one criterion which should be included in textbook evaluation. Readability is objective, but should be utilized in conjunction with other criteria such as format, content, and teaching/learning aids.

7. Textbook authors should be aware of audience capabilities. Authors should apply a readability formula to textbooks and other instructional materials.

Recommendations for Further Research

The following studies are recommended for possible further research:

1. The study should be replicated in other business administration content areas in order to explore the readability of selected high school, vocational, and college textbooks in those areas.

2. A study should be conducted to determine whether accounting textbooks which have the largest number of adoptions have reading levels which are higher than or lower than textbooks which have the smallest number of adoptions. Such a study should also be conducted in other business administration content areas.

3. A study should be conducted to compare the reading levels of traditional accounting textbooks with the reading levels of programmed textbooks in order to determine if textbooks designed for self-directed study have lower reading levels than textbooks designed for class study. The study should also be conducted in other business administration content areas.

4. A study should be conducted to compare the reading levels of procedural accounting textbooks with the reading levels of conceptual accounting textbooks at the college level.

5. A study should be conducted to determine the relationship between students' reading levels and/or educational levels and the readability of accounting textbooks. A similar study should be conducted in other business administration content areas.

Concluding Comments

The study explored the readability of selected high school, vocational, and college accounting textbooks. The exploration provided teachers with a summary of certain characteristics of readability formulas and a method of applying the Flesch Reading Ease formula to accounting textbooks. The study hopefully served a useful purpose by providing teachers with the information necessary to match the difficulty level of accounting textbooks and the reading ability of students.

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APPENDIX A

APPLICATION OF THE FLESCH READING EASE FORMULA

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

High School Book 1	Step 1 Letters	Step 2 $\div 3.1127$	Step 3 $\div 3$	Step 4 $\times .0846$	Step 5 Words	Step 6 Sentences	Step 7 \div	Step 8 $\times .1015$	Step 9 (4+8) -5.685
Chapter A	474 478 434	445.27	148.42	12.56	103 98 90	7 6 <u>5</u> 18	16.17	1.64	8.52
Chapter B	469 427 428	425.35	141.79	12.00	108 95 93	6 6 <u>5</u> 17	17.41	1.77	8.09
Chapter C	461 497 476	460.69	153.56	12.99	103 103 92	7 6 <u>4</u> 17	17.53	1.78	9.09
Chapter D	449 434 480	437.88	145.96	12.35	102 97 106	4 4 <u>6</u> 14	21.79	2.21	8.88
Chapter E	461 507 478	464.55	154.85	13.10	102 112 89	7 5 <u>4</u> 16	18.94	1.92	9.34
Chapter F	465 437 486	445.92	148.64	12.57	100 105 107	4 6 <u>8</u> 18	17.33	1.76	8.65

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

High School Book 2	Step 1 Letters	Step 2 $\div 3.1127$	Step 3 $\div 3$	Step 4 $\times .0846$	Step 5 Words	Step 6 Sentences	Step 7 \div	Step 8 $\times .1015$	Step 9 (4+8) -5.685
Chapter A	520 467 513	481.90	160.63	13.59	108 89 92	5 4 <u>5</u> 14	20.64	2.10	10.01
Chapter B	525 431 523	475.15	158.38	13.40	112 97 101	4 5 <u>5</u> 14	22.14	2.25	9.97
Chapter C	463 424 479	438.85	146.28	12.38	102 92 82	5 7 <u>4</u> 16	17.25	1.75	8.45
Chapter D	521 441 481	463.59	154.53	13.07	99 102 91	6 5 <u>5</u> 16	18.25	1.85	9.24
Chapter E	541 479 460	475.47	158.49	13.41	104 97 102	5 5 <u>7</u> 17	17.82	1.81	9.54
Chapter F	534 464 523	488.64	162.88	13.78	91 103 96	6 6 <u>6</u> 18	16.11	1.64	9.74

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

High School Book 3	Step 1 Letters	Step 2 ÷3.1127	Step 3 ÷3	Step 4 x.0846	Step 5 Words	Step 6 Sentences	Step 7 ÷	Step 8 x.1015	Step 9 (4+8) -5.685
Chapter A	483 512 507	482.54	160.85	13.61	94 116 98	5 6 <u>4</u> 15	20.53	2.08	10.01
Chapter B	448 473 508	459.09	153.03	12.95	95 110 89	4 4 <u>4</u> 12	24.50	2.49	9.76
Chapter C	559 448 488	480.29	160.10	13.54	99 86 105	5 4 <u>5</u> 14	20.71	2.10	9.96
Chapter D	499 424 446	439.81	146.60	12.40	90 102 86	3 6 <u>4</u> 13	21.38	2.17	8.89
Chapter E	479 466 421	438.85	146.28	12.38	84 107 108	2 6 <u>5</u> 13	23.00	2.33	9.03
Chapter F	499 476 501	474.19	158.06	13.37	99 96 83	7 6 <u>4</u> 17	16.35	1.66	9.35

APPLICATION OF THE FLESCH READING EASE FORMULA---continued

Vocational Book 1	Step 1 Letters	Step 2 ÷3.1127	Step 3 ÷3	Step 4 x.0846	Step 5 Words	Step 6 Sentences	Step 7 ÷	Step 8 x.1015	Step 9 (4+8) -5.685
Chapter A	460 437 460	435.96	145.32	12.29	105 93 90	3 5 <u>5</u> 13	22.15	2.25	8.86
Chapter B	458 411 496	438.53	146.18	12.37	93 114 105	5 5 <u>6</u> 16	19.50	1.98	8.67
Chapter C	454 488 507	465.51	155.17	13.13	96 95 94	6 3 <u>3</u> 12	23.75	2.41	9.86
Chapter D	524 462 507	479.65	159.88	13.53	92 109 93	4 4 <u>5</u> 13	22.62	2.30	10.15
Chapter E	556 505 490	498.28	166.09	14.05	95 97 97	5 3 <u>3</u> 11	26.27	2.67	11.04
Chapter F	535 505 462	482.54	160.85	13.61	88 113 97	4 4 <u>4</u> 12	24.83	2.52	10.45

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

Vocational Book 2	Step 1 Letters	Step 2 ÷3.1127	Step 3 ÷3	Step 4 x.0846	Step 5 Words	Step 6 Sentences	Step 7 ÷	Step 8 x.1015	Step 9 (4+8) -5.685
Chapter A	500 480 532	485.75	161.92	13.70	106 103 94	5 5 <u>4</u> 14	21.64	2.20	10.22
Chapter B	541 476 476	479.65	159.88	13.53	95 90 107	5 3 <u>5</u> 13	22.46	2.28	10.13
Chapter C	499 471 526	480.61	160.20	13.55	96 101 103	4 8 <u>5</u> 17	17.65	1.79	9.66
Chapter D	468 511 568	497.00	165.67	14.02	102 98 99	5 6 <u>6</u> 17	17.59	1.79	10.13
Chapter E	534 493 497	489.61	163.20	13.81	99 104 107	5 5 <u>6</u> 16	19.38	1.97	10.10
Chapter F	470 464 495	459.09	153.03	12.95	94 103 104	5 5 <u>6</u> 16	18.81	1.91	9.18

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

Vocational Book 3	Step 1 Letters	Step 2 $\div 3.1127$	Step 3 $\div 3$	Step 4 $\times .0846$	Step 5 Words	Step 6 Sentences	Step 7 \div	Step 8 $\times .1015$	Step 9 (4+8) -5.685
Chapter A	477 452 429	436.28	145.43	12.30	91 109 104	4 6 <u>7</u> 17	17.88	1.82	8.44
Chapter B	478 430 495	450.73	150.25	12.71	95 92 107	6 3 <u>4</u> 13	22.62	2.30	9.33
Chapter C	462 484 451	448.81	149.60	12.66	92 97 100	5 5 <u>6</u> 16	18.06	1.83	8.81
Chapter D	429 481 474	444.63	148.21	12.54	114 98 96	6 4 <u>5</u> 15	20.53	2.08	8.94
Chapter E	468 548 475	479.01	159.67	13.51	113 93 104	7 5 <u>7</u> 19	16.32	1.66	9.49
Chapter F	510 460 556	490.25	163.42	13.83	85 92 103	5 4 <u>6</u> 15	18.67	1.89	10.04

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

College Book 1	Step 1 Letters	Step 2 $\div 3.1127$	Step 3 $\div 3$	Step 4 $\times .0846$	Step 5 Words	Step 6 Sentences	Step 7 \div	Step 8 $\times .1015$	Step 9 (4+8) -5.685
Chapter A	557 472 480	484.79	161.60	13.67	103 95 84	5 4 <u>3</u> 12	23.50	2.39	10.38
Chapter B	512 503 464	475.15	158.38	13.40	101 103 101	4 4 <u>3</u> 11	27.73	2.81	10.53
Chapter C	588 504 525	519.49	173.16	14.65	108 101 113	6 6 <u>5</u> 17	18.94	1.92	10.89
Chapter D	535 519 462	487.04	162.35	13.73	97 107 97	4 3 <u>3</u> 10	30.10	3.06	11.11
Chapter E	454 458 446	436.28	145.43	12.30	87 89 110	4 3 <u>6</u> 13	22.00	2.23	8.85
Chapter F	506 553 442	482.22	160.74	13.60	110 107 87	6 4 <u>2</u> 12	25.33	2.57	10.49

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

College Book 2	Step 1 Letters	Step 2 ÷3.1127	Step 3 ÷3	Step 4 x.0846	Step 5 Words	Step 6 Sentences	Step 7 ÷	Step 8 x.1015	Step 9 (4+8) -5.685
Chapter A	495 536 484	486.72	162.24	13.73	90 100 100	5 4 <u>4</u> 13	22.31	2.26	10.31
Chapter B	491 497 489	474.51	158.17	13.38	79 106 99	3 6 <u>4</u> 13	21.85	2.22	9.92
Chapter C	483 424 442	433.39	144.46	12.22	103 109 95	4 6 <u>4</u> 14	21.93	2.23	8.77
Chapter D	527 486 499	485.75	161.92	13.70	98 94 119	4 4 <u>5</u> 13	23.92	2.43	10.45
Chapter E	519 547 450	487.04	162.35	13.73	92 94 88	4 4 <u>2</u> 10	27.40	2.78	10.83
Chapter F	484 501 483	471.62	157.21	13.30	90 105 89	4 5 <u>4</u> 13	21.85	2.22	9.84

APPLICATION OF THE FLESCH READING EASE FORMULA--continued

College Book 3	Step 1 Letters	Step 2 ÷3.1127	Step 3 ÷3	Step 4 x.0846	Step 5 Words	Step 6 Sentences	Step 7 ÷	Step 8 x.1015	Step 9 (4+8) -5.685
Chapter A	483 469 544	480.61	160.20	13.55	93 80 96	3 2 <u>5</u> 10	26.90	2.73	10.60
Chapter B	533 410 474	455.23	151.74	12.84	84 98 98	4 5 <u>3</u> 12	23.33	2.37	9.53
Chapter C	523 422 493	461.98	153.99	13.03	92 92 107	5 3 <u>4</u> 12	24.25	2.46	9.81
Chapter D	490 532 484	483.82	161.28	13.64	96 104 107	4 4 <u>5</u> 13	23.62	2.40	10.36
Chapter E	439 485 520	463.91	154.64	13.08	102 94 96	5 4 <u>4</u> 13	22.46	2.28	9.68
Chapter F	530 493 490	486.07	162.02	13.71	98 97 109	4 5 <u>6</u> 15	20.27	2.06	10.09